Remarks

The present application is directed to methods for detecting cancer by combining mammalian autoantibodies with a patient sample to determine whether cancer-associated marker proteins are present. The autoantibodies demonstrate a higher affinity than monoclonal antibodies for cancer-associated marker proteins, thereby enabling early cancer detection and the ability to commence treatment and enhance cancer patient survival.

Claims 1-4 and 52-66 are pending. Claims 1-4, 54-58, and 66 have been amended to more particularly point out and distinctly claim the subject matter which applicants regard as their invention. Claims 5-51 have previously been cancelled.

Summary of the Interview

Applicants wish to thank the Examiner for her time and consideration during the personal interview with John Robertson, one of the inventors of the present application, and applicants' representative, Jamie Greene, on October 7, 2004. During the interview, Dr. Robertson explained how Figures 1 and 2 of the present application demonstrate the specificity and affinity of autoantibodies to cancer-associated MUC1 tumor marker protein. Data for autoantibodies to additional tumor marker proteins was requested by the Examiner and provided by Dr. Robertson with reference to images on his laptop computer. The advantages of the claimed methods over the cited prior art references, which disclose monoclonal antibodies to tumor markers, were discussed.

Statement Regarding the Abstract of the Invention

In the submission mailed March 4, 2004, with the filing of an Amendment and Response to Office Action, a non-related Abstract was erroneously included due to a clerical mistake. Applicants apologize for the inconvenience and enclose a substitute Abstract with this Supplemental Amendment.

Rejection Under 35 U.S.C. § 103

In the Office Action mailed May 26, 2004, the Examiner rejected Claims 1-4 under 35 U.S.C. § 103(a) as unpatentable over von Mensdorff-Pouilly *et al.* (*Eur J Cancer* 1996 32 :1325-1331) or Gourevitch *et al.* (*Br J Cancer* 1995 72 :934-938) in view of Petrarca *et al.* (Eur J Cancer 1996 32 :2155-2163). Applicants respectfully traverse.

The scientific papers of Mensdorff-Pouilly *et al.* and Gourevitch *et al.* teach the use of monoclonal antibodies for the detection of tumor marker proteins. Petrarca discloses the epitope mapping of anti-MUC-1 antibodies to identify epitopes to use as vaccines for cancer treatment.

During the interview with the Examiner on October 7, 2004, Dr. Robertson explained how the Examples and the comparative data provided in Figures 1 and 2 of the present application demonstrate that autoantibodies have higher sensitivities and affinities than monoclonal antibodies for cancer-associated markers proteins to MUC1. Data showing the superior reactivities of autoantibodies to additional cancer maker proteins were provided to the Examiner via computer images contained on Dr. Robertson's laptop computer. As suggested by the Examiner, applicants submit the enclosed Declaration Under 37 C.F.R. §1.132 by John Robertson, which contains the data provided to the Examiner during the interview (Figures 3-9

of the Declaration) as well as additional data (Figures 1-2 of the Declaration). Applicants respectfully submit that the data presented in the enclosed Declaration demonstrate that autoantibodies have high sensitivities and affinities for various cancer-associated markers including **MUC1** (Figs. 1, 2, and 3a), **c-myc** (Fig. 3b), **p53** (Fig. 4a), **c-erbB2** (Fig. 4b), **BRCA1** (Fig. 5), **BRCA2** (Fig. 6), **ras** (Fig. 7), **APC** (Fig. 8), and **PSA** (Fig. 9).

Applicants unexpectedly discovered that autoantibodies are more **specific** than monoclonal antibodies for cancer-associated marker proteins and are able to **distinguish** between normal and pathological isoforms of a tumor marker protein. In addition, as shown in Figures 1 and 2 of the present application, autoantibodies display a high **affinity** for cancer-associated marker protein, but little or no affinity for normal protein, thereby providing a sensitive tumor marker assay that can detect small amounts of cancer that might not be detectable by conventional methods, such as a mammogram.

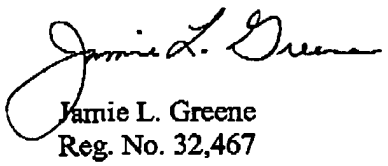
By utilizing autoantibodies, the claimed methods provide superior detection of cancer-associated markers and reduce the occurrence of false positive test results and missed diagnoses. Earlier, more accurate cancer detection facilitates the commencement of prompt treatment, which is likely to result in increased patient survival. Such an improvement in diagnostics could not have been predicted or developed absent the teachings of the present specification, thereby supporting a case of non-obviousness.

CONCLUSION

In view of the foregoing, allowance of Claims 1-4 and 52-66 is respectfully solicited. Applicants respectfully submit that the present application is in condition for immediate allowance. An early notification is earnestly solicited.

If the Examiner has any questions, or further issues remain to be resolved, the Examiner is requested to contact the undersigned at (404) 745-2473.

Respectfully submitted,



Jamie L. Greene
Reg. No. 32,467

KILPATRICK STOCKTON LLP
1100 Peachtree Street
Suite 2800
Atlanta, Georgia 30309-4530
Tel. (404) 745-2473
Attorney Docket: 02332-0020 (49409-264826)